FIG.1

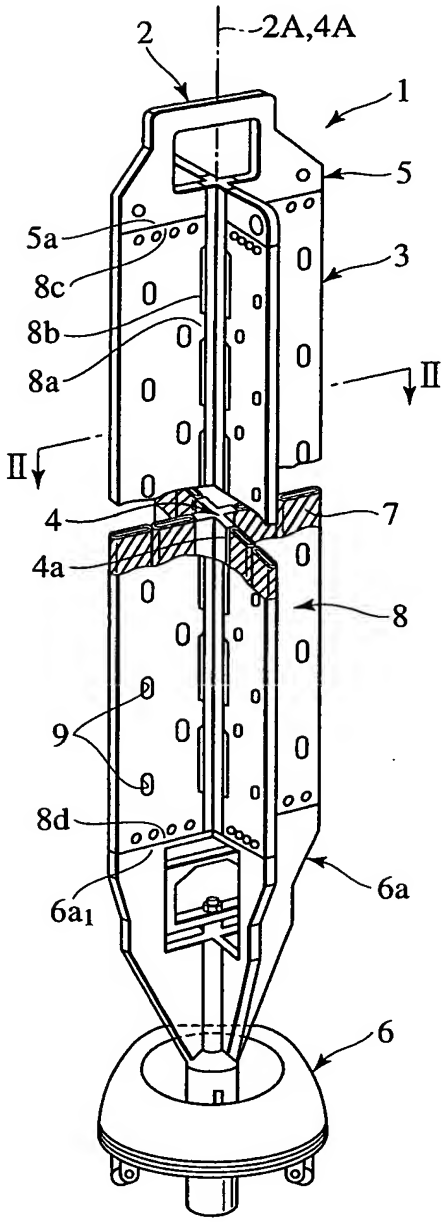

FIG.2

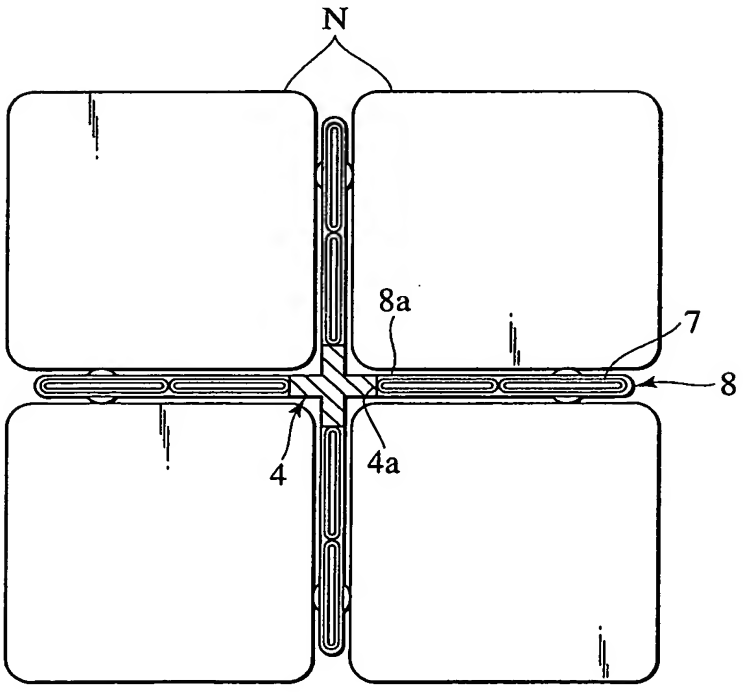

FIG.3

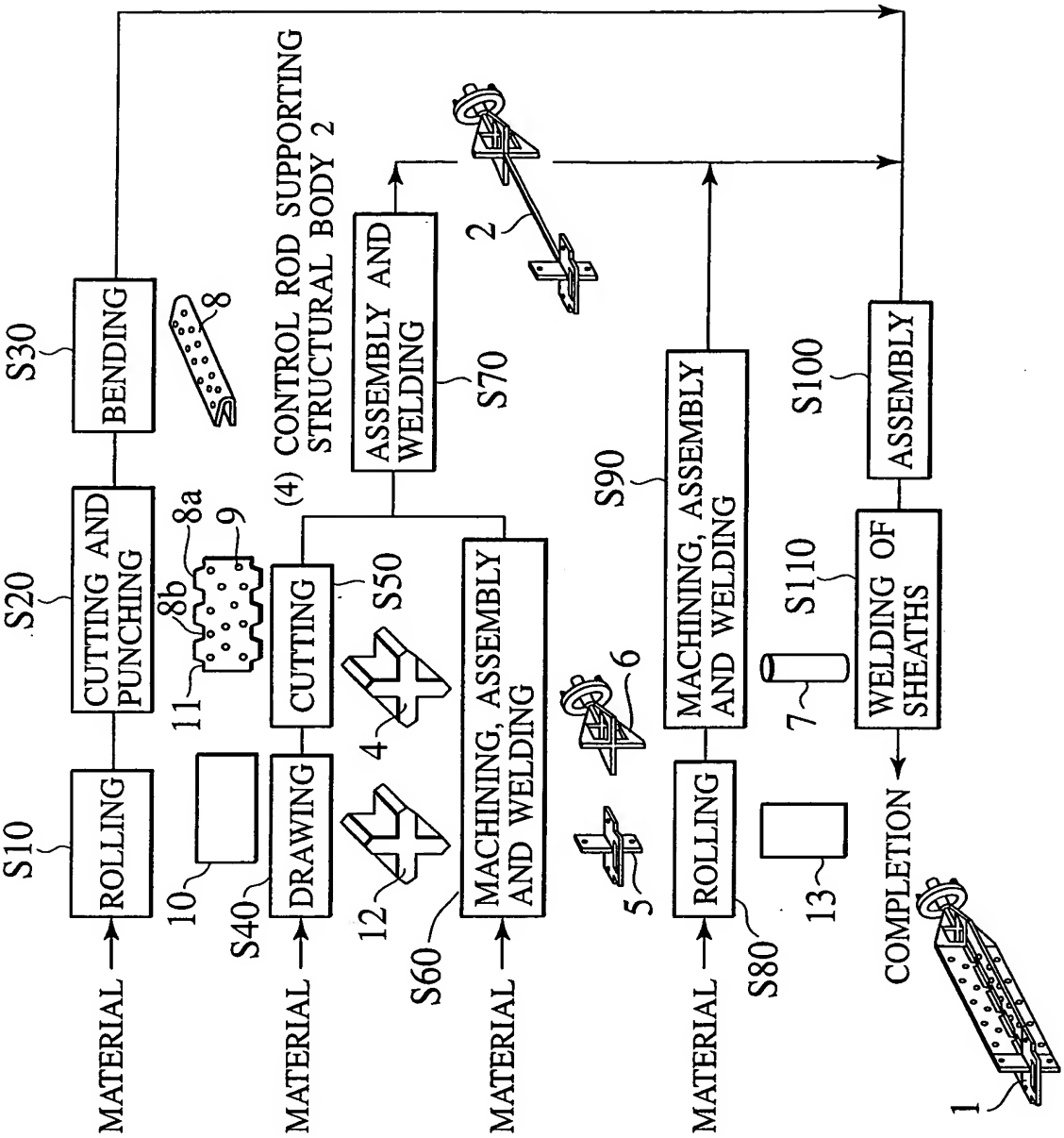
(1) SHEATH 8
(2) TIE ROD 4
(3) HANDLE 5, VELOCITY LIMITER 6 AND OTHER COMPONENTS
(5) HAFNIUM FLAT TUBE 7 (NEUTRON ABSORBING MATERIAL)
(6) CONTROL ROD 1
(4) CONTROL ROD SUPPORTING STRUCTURAL BODY 2
MATERIAL
ROLLING
S10
CUTTING AND PUNCHING
S20
BENDING
S30
8
8a
8b
9
10
11
DRAWING
S40
CUTTING
S50
4
12
MACHINING, ASSEMBLY AND WELDING
S60
5
6
ASSEMBLY AND WELDING
S70
2
ROLLING
S80
MACHINING, ASSEMBLY AND WELDING
S90
13
7
WELDING OF SHEATHS
S110
ASSEMBLY
S100
COMPLETION
1

FIG.4A

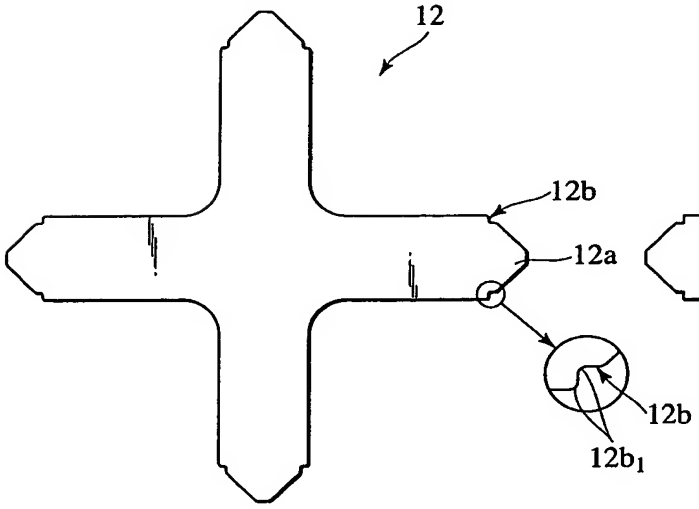

FIG.4B

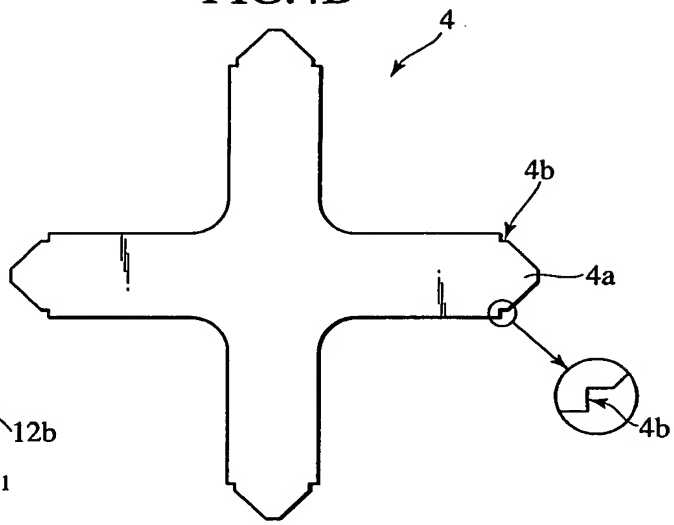

FIG.5

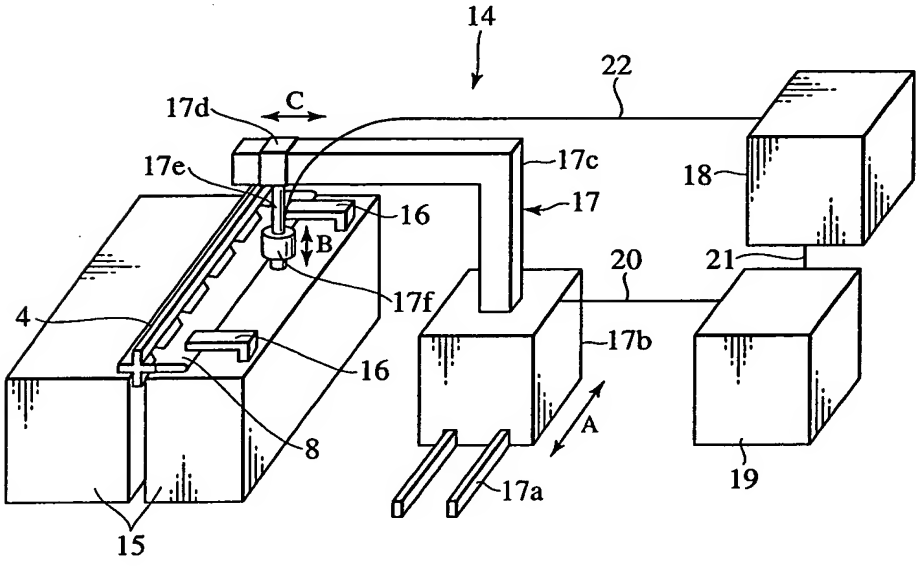

FIG.6

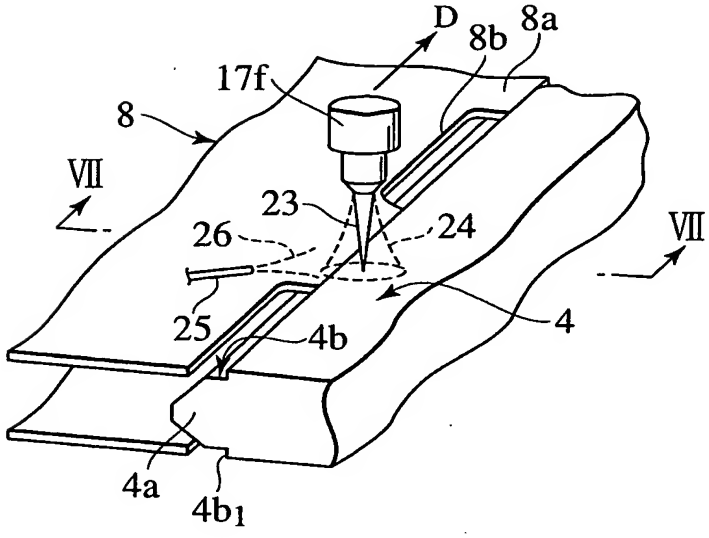

FIG.7

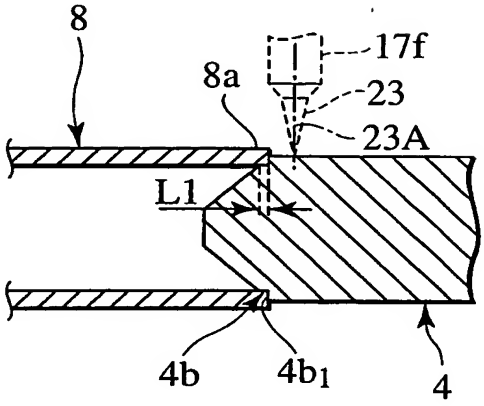

FIG.8

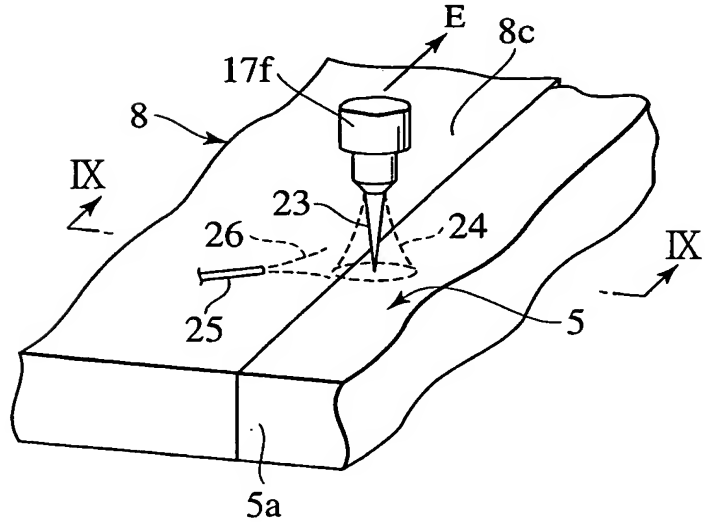

FIG.9

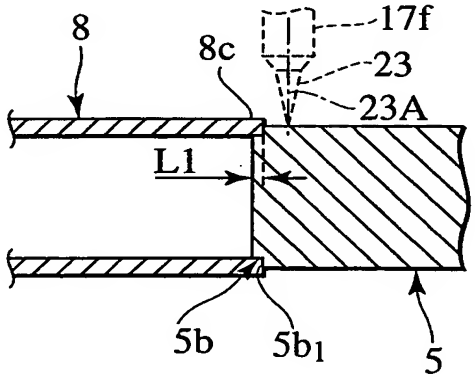

FIG.10

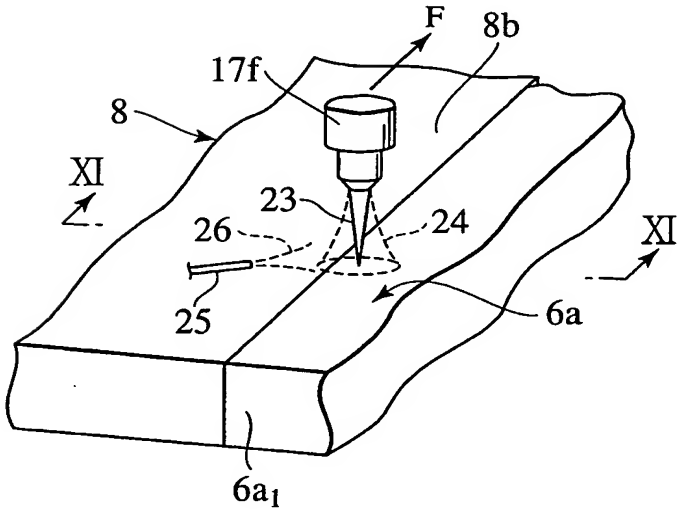

FIG.11

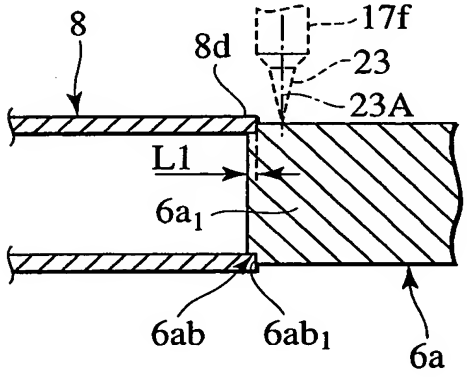

FIG.12

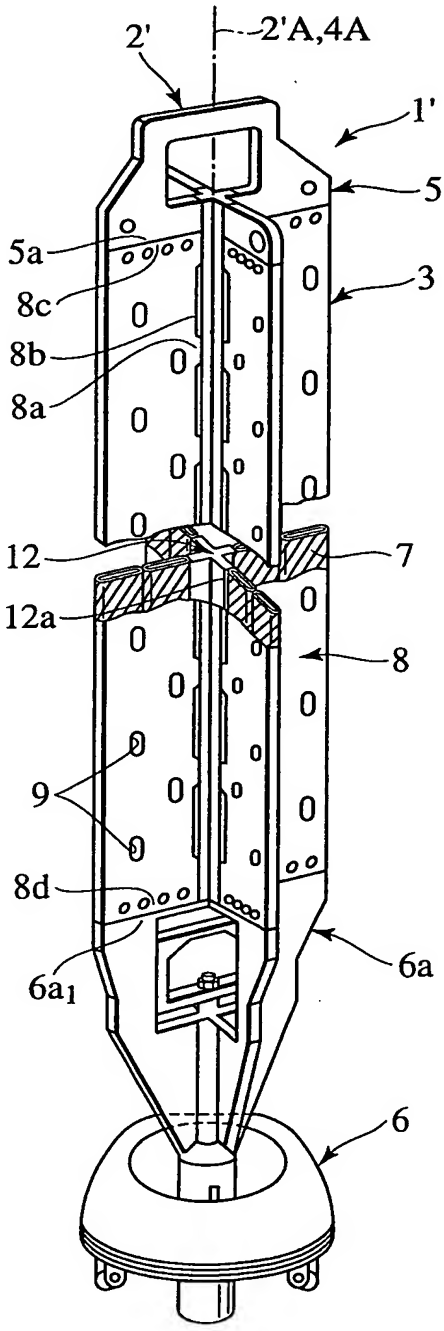

FIG.13

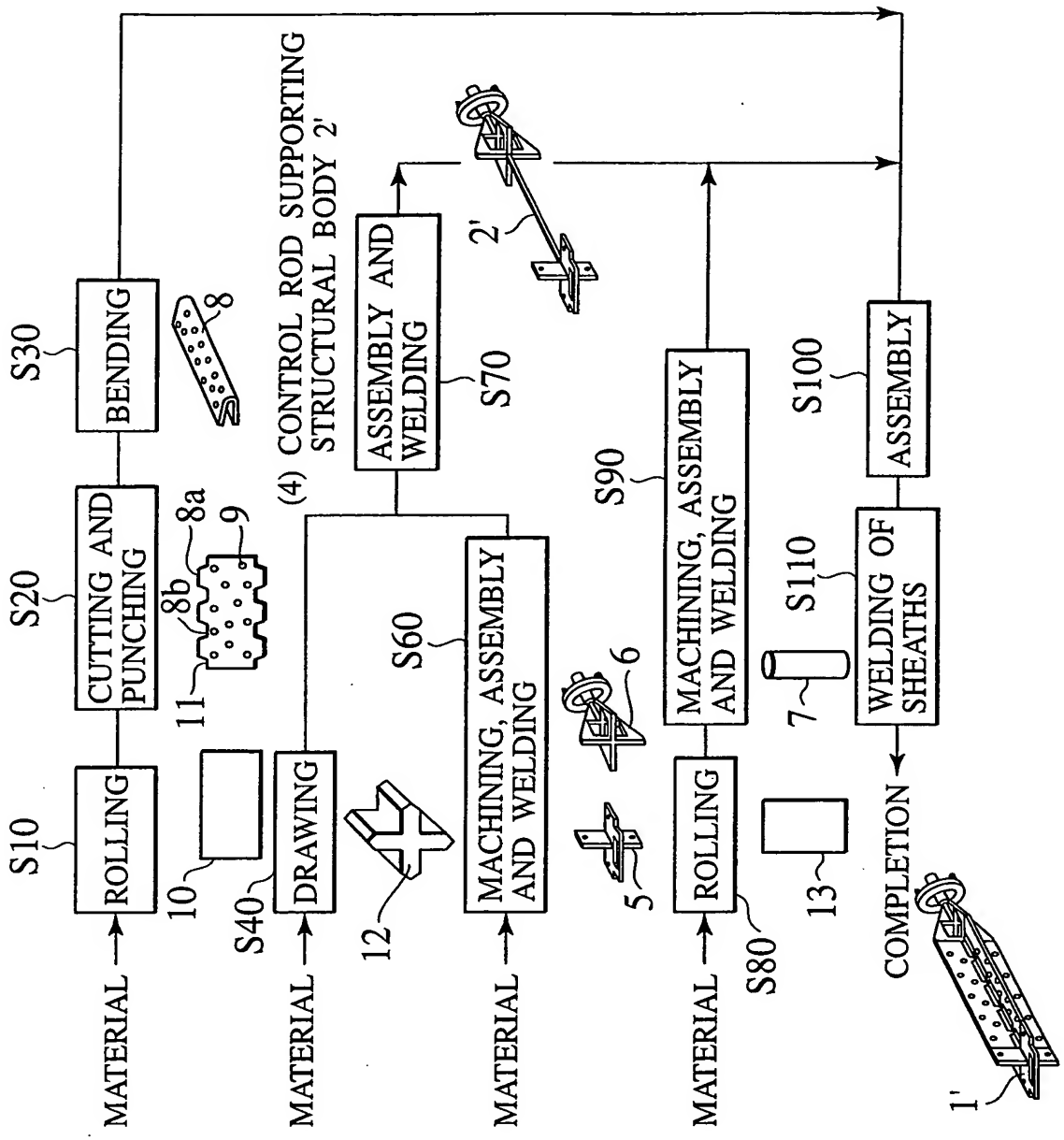
(1) SHEATH 8
(2) DRAWN TIE ROD 4
(3) HANDLE 5, VELOCITY LIMITER 6 AND OTHER COMPONENTS
(5) HAFNIUM FLAT TUBE 7 (NEUTRON ABSORBING MATERIAL)
(6) CONTROL ROD 1'
(4) CONTROL ROD SUPPORTING STRUCTURAL BODY 2'
MATERIAL
S10
ROLLING
S20
CUTTING AND PUNCHING
S30
BENDING
S40
DRAWING
S60
MACHINING, ASSEMBLY AND WELDING
S70
ASSEMBLY AND WELDING
S80
ROLLING
S90
MACHINING, ASSEMBLY AND WELDING
S100
ASSEMBLY
S110
WELDING OF SHEATHS
COMPLETION
8
8a
8b
9
10
11
12
13
2'
5
6
7
1'

FIG.14

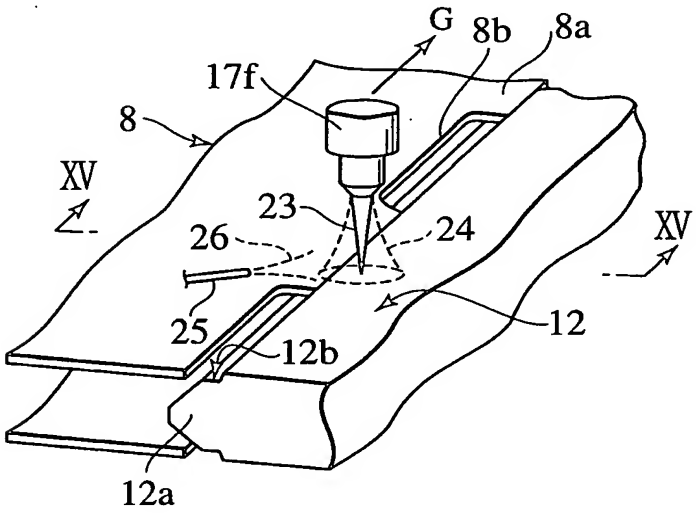

FIG.15

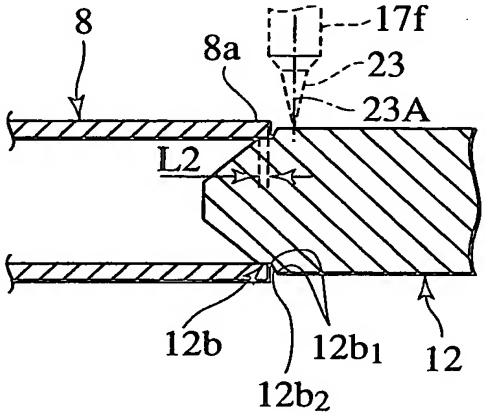

FIG.16

MODE OF YAG LASER OUTPUT	CONTINUOUS WAVE
WELDING LENGTH (mm)	30
NUMBER OF WELDING PASSES	1
TRAILER GAS, SHIELDING GAS	N_2
DIAMETER (mm) OF WELDING ROD 30	0.6
GAP (mm) BETWEEN TIE ROD 4 AND SHEATH 8	0~0.3
DISTANCE (mm) FROM EDGE OF SHEATH PROJECTION 8A TO BEAM CENTRAL AXIS 23A (WHEN DIRECTION TOWARD SHEATH 8 IS POSITIVE, AND DIRECTION TOWARD AXIS CENTER 4A OF TIE ROD 4 IS NEGATIVE)	−0.5~0.5
HEAT INPUT (kJ/cm)	0.69~1.63
CONVERGING DIAMETER (mm)	0.57~0.98
SUPPLY (g/m) OF CONTROL ROD 30 FOR ONE METER OF WELDING	1.25~4.06
OVERLAP (mm) OF TIE ROD 4 WITH SHEATH 8	0.2~0.8

FIG.17

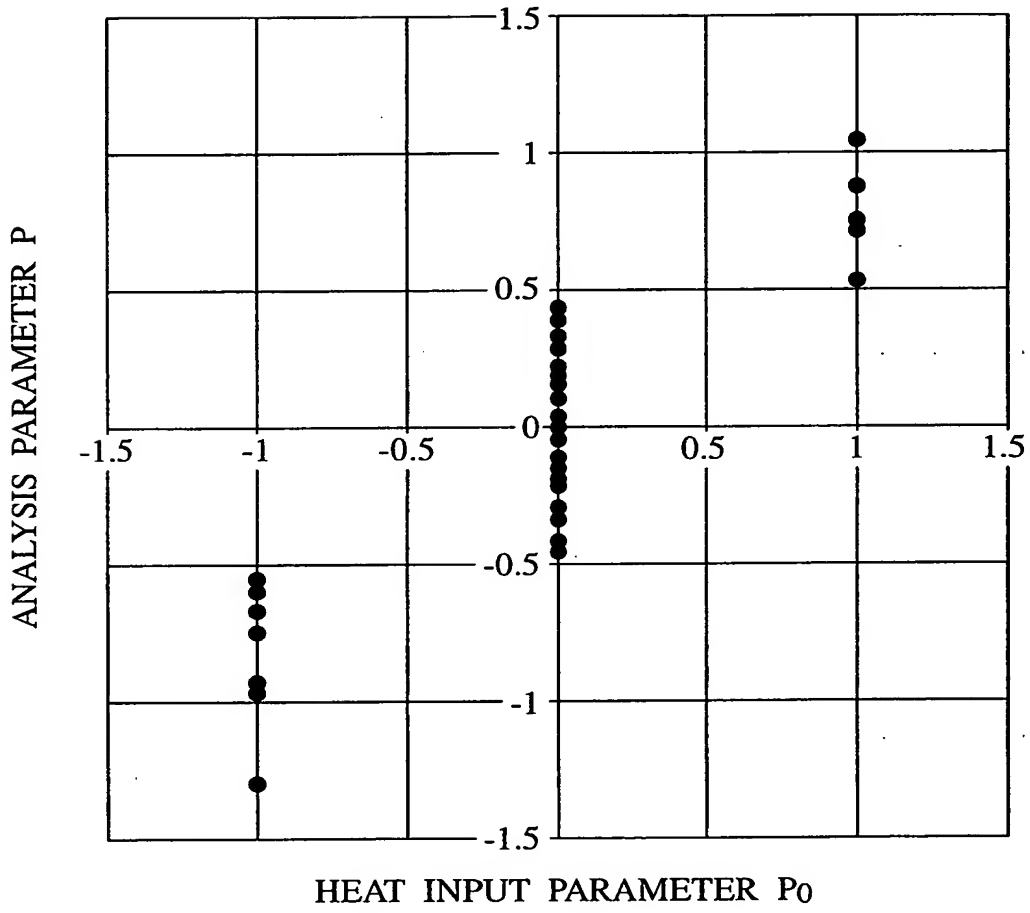
1.5
1
0.5
0
-0.5
-1
-1.5
-1.5
-1
-0.5
0.5
1
1.5
ANALYSIS PARAMETER P
HEAT INPUT PARAMETER Po

FIG.18

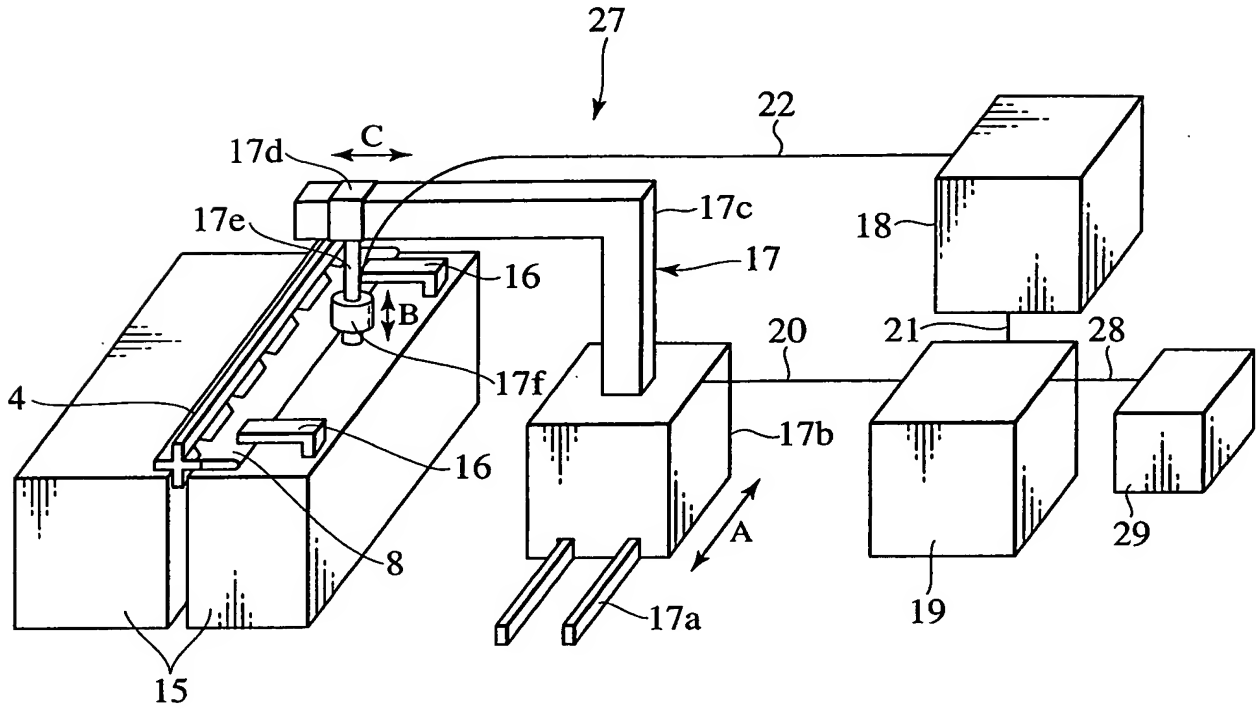

FIG.19

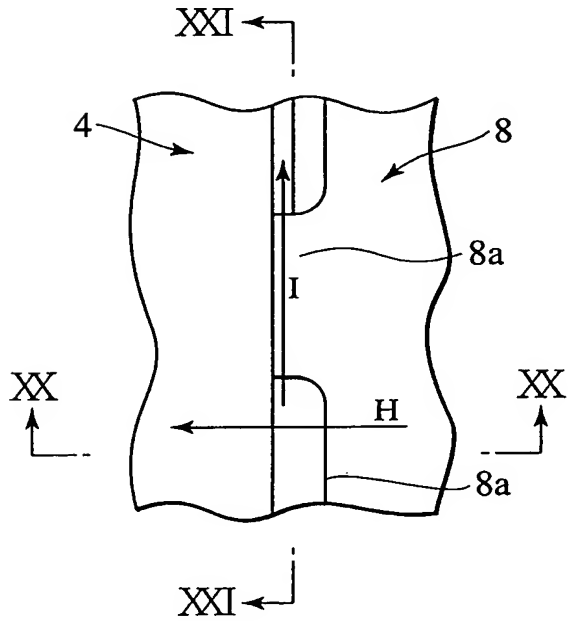

FIG.20

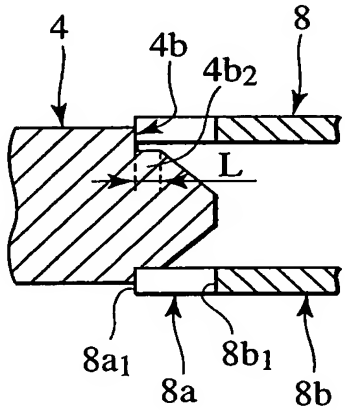

FIG.21

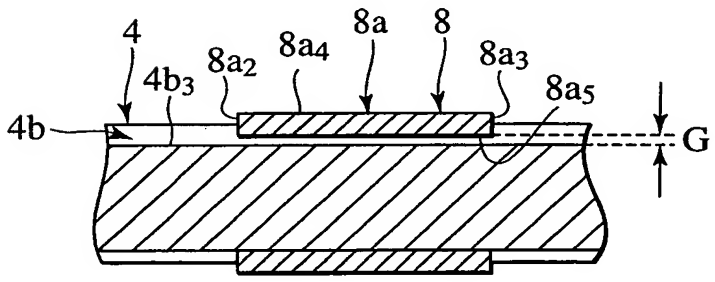

FIG.22

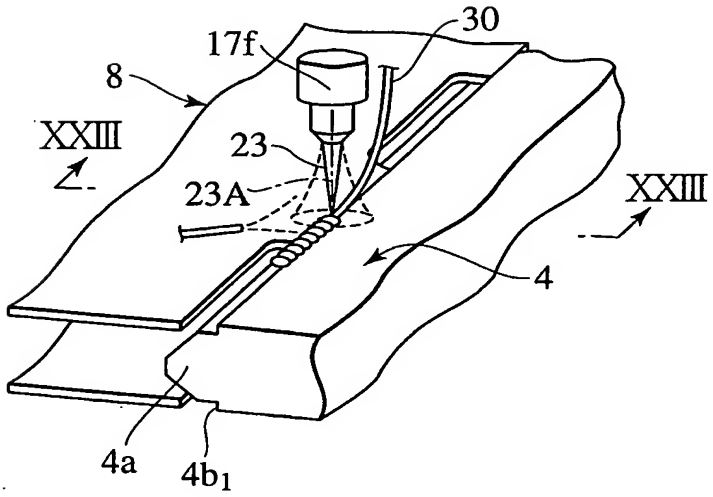

FIG.23